Memorandum

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Pages: 5

To: Bill Pavão, Executive Director
Lisa Vergolini, Deputy Director
Ed Johnson, Program Manager

From: Adrian Ownby, Program Analyst

Subject: Revising Threshold Basis Limits Using TCAC Cost Data

This memorandum outlines TCAC staff's efforts to construct and index a data set using the existing TCAC portfolio of new construction projects, for the purposes of replacing the current threshold basis limit system.

The Underlying Data

The underlying data set initially consisted of 9% new construction projects from 1997 through the present. This initial data set and was used to create housing cost factor used to determine the percentages for the 2003 geographic reapportionment. The current underlying data set consists of total project costs, land costs and structures costs (calculated as total project costs less all costs associated with land[1]), total units and square footage data for both 4% and 9% new construction projects from 1997 through the end of 2006 – a total of 1,007 projects.

Rehabilitation and mixed-use projects (i.e., projects with commercial costs) were excluded from the data set to help insure data consistency and validity.[2] Projects that were a combination of rehabilitation and new construction were excluded, as were projects for which the "total square footage of all project structures" could not be determined. Mixed income projects were included in the data set. The data set combines both initial costs submitted at application (for more recent projects) and, when available, data from the accountant prepared final cost certifications submitted after a project has been placed in service. Similarly, project "total units" (low income units plus manager and market rate units) and "total project square footage of all structures" are also updated from final cost certifications, where necessary using Form Bs submitted with the request for federal tax forms. Outliers, based on regional means and standard deviations from those means were identified for further follow-up.

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[1] It should be noted that nearly all projects have other costs that cannot be claimed in eligible basis, and since the limits TCAC is attempting to formulate are limits on eligible basis that can be claimed, this definition is actually somewhat generous.

[2] Mixed-use projects were excluded because of the variation in accounting for square footage as well as costs. Additionally, there is some concern that, in certain circumstances the creation of commercial space might increase residential costs as well. Rehabilitation projects were excluded for obvious reasons.

Indexing the Data

Staff reviewed, analyzed and rejected several potential indices:

- Engineering News and Review Construction Cost Index: A 20-city national average index, based on a set amount of materials (steel, concrete and lumber) and 200 hours of common labor multiplied by the 20-city average rate for wages and fringe benefits. Rejected due to its national focus.
- Engineering News and Review Building Cost Index: A 20-city national average index, based on a set amount of materials (steel, concrete and lumber) and 68.38 hours of skilled labor multiplied by the 20-city average rate for wages and fringe benefits for three trades (bricklayers, carpenters and structural ironworkers). Rejected due to its national focus.
- Census Bureau's Western US Annual Price Index of New One-Family Houses Sold, Including Value of Lot and Holding House Characteristics Constant: Rejected due to its multi-state nature and indirect applicability to multi-family construction costs.
- Bureau of Economic Analysis/Census Bureau Annual Average GDP Chained Price Index for Residential Construction -- Multi-family Buildings: Rejected based on the national nature of the index and recommendation of Census Bureau analyst who noted that the index is produced for the BEA, but that it is constructed based on two different surveys and the Census Bureau itself does not use the index.
- Census Bureau's Consumer Price Index: The general CPI was considered but rejected as far too general. The housing portion of the CPI considers only non-construction related housing costs and is therefore inappropriate.

Staff considers two indices, both recommended by several professional contacts, as strong candidates for a statewide or regional index:

- R.S. Means Construction Costs: The R.S. Means' publication is oriented toward the construction industry. According to page iv of R.S. Means' annual construction costs publication:

  > These (Historical Cost) indexes provide you with data to adjust construction costs over time. If you know costs for a project completed in the past, you can use these indexes to calculate a rough estimate of what it would cost to construct the same project today. This book is aimed primarily at commercial and industrial projects costing $1 million or more, or large multi-family housing projects. Costs are primarily for new construction or major renovation of buildings rather than repairs or minor alterations.

  This publication's historical and various California cities[3] cost indexes are very appropriate for developing a cost index for TCAC projects. Unlike Marshall and Swift's annual/quarterly publication (see below), this publication does not have a user-friendly inflationary index for various California cities, however more cities are

[3] California cities included in this publication are: Anaheim, Bakersfield, Fresno, Los Angeles, Oakland, Oxnard, Redding, Riverside, Sacramento, San Diego, San Francisco, San Jose, Santa Barbara, Stockton and Vallejo. Each of TCAC's regions are represented by one or more of these cities, with the sole exception of the Orange County region. Data for Los Angeles was used to develop the Orange County regional index.

included. This publication's index is the only index found to date that staff feels can be used to produce regional cost indexes for all of the TCAC regions.[4]

- Marshall & Swift Construction Costs: The Marshall & Swift publication is oriented toward the appraisal profession. According to section 1, Page 1 of the Marshall Valuation Service publication:

  > (The publication) provides cost data for determining replacement costs of buildings and other improvements in the 50 states. (The publication) is a comprehensive appraisal guide for developing replacement costs, depreciated values, and insurable values of buildings and other improvements. It provides costs for a wide range of construction classes and types of occupancies . . .

  The publication includes indices for five building classifications and staff chose Class B as the most appropriate for analysis of multifamily housing.[5] Staff was unable to utilize the historical city costs indices provides by this publication, and chose instead to use the Southwest Cities Historical index in its analysis.[6]

Staff has chosen the R.S. Means' data to construct inflation indices. Coincidentally, this is the same construction cost indices that a recent research study conducted for HUD found to be the most accurate.[7] The R.S. Means inflators are focused on construction costs for large commercial projects, industrial projects and multifamily housing, rather than appraising as the Marshall and Swift indices. Also, the R.S. Means' mix of city-level cost adjusters was more adaptable to TCAC's current regional system. Regional inflation factors are developed based on the R.S. Means Historical Current Cost Index and the various City Indexes. Each project's costs are inflated from the year subsequent to their award (i.e., a 1997 project is inflated assuming costs were incurred in 1998) based on their regional location.

Expressing the Data

Staff considered various methods of expressing the data for use in calculating a threshold basis limits under a new system. These methods of expression included:

- Construction Costs Per-Unit: Staff considered and discarded the concept of using a simple per-unit basis for the new method of calculating threshold limits. Staff found no evidence to support this as the best, most even-handed and fair method of calculating

[4] Marshall and Swift's index failed to include historical indexes for any cities in the East Bay, Orange County, West Bay and Coastal California regions.

[5] According to the publication, "the primary characteristic of a Class B building is the reinforced concrete frame in which the columns and beams can be either formed or precast concrete. They may be mechanically stressed. It is a fire resistant structure. Floors and roofs . . . are formed or precast concrete slabs. The exterior walls will generally be masonry or reinforced concrete curtain walls or any of the many types of wall panels of concrete, metal glass or stone, etc." Generally, the definition of Class A buildings may be most appropriate for very high-density urban high-rise buildings, and the definition of a Class C building more appropriate for low-density rural townhouses, however, the Class B definition seemed best capture the combination of multi-story higher density apartments that have been constructed to meet seismic safety standards that could be considered a "typical" TCAC development.

[6] The Southwest Cities Historical Index includes two cities (Phoenix and Reno), outside of California and eight California cities including Eureka, Sacramento, San Francisco, Fresno, Bakersfield, Los Angeles, Riverside and San Diego. The regional city average aggregate index consists of all the above noted cities.

[7] Construction Cost Indices: HUD Section 202 and 811 Supportive Housing Programs, NAHB Research Center, Inc. and Columbia Enterprises, Inc., April 2005. See Major Finding #1 on page vii.

basis limits given the wide variety to project types and unit mixes among TCAC's new construction portfolio.

- Construction Costs Per-Bedroom: Similarly, staff considered and discarded the concept of using a simple per-bedroom basis for the new method of calculating threshold limits. No convincing argument has been made that a two-bedroom unit is twice as expensive as a one-bedroom unit, that a four-bedroom unit is twice as expensive as a two bedroom unit or thirty-three (33) percent more expensive than three-bedroom unit, etc. Furthermore, unlike the number of units and project square footage measures, bedroom counts are not tracked by TCAC's database.
- Construction Costs Per-Unit Based on Bedroom Size: The current 221(d)(3) system of basis limits is based on the number of bedrooms per unit count. In 2004, staff analyzed two scenarios using both the R.S. Means and Marshall & Swift adjusted total project cost per total project square footage on a county-by-county basis. Staff used the following unit sizes as basis for calculating a unit-size based eligible basis limit: 500 SF for a zero-bedroom/SRO unit; 750 SF for a one-bedroom unit; 1000 SF for a two-bedroom unit; 1200 SF for a three-bedroom unit; and 1500 SF for a four-bedroom or larger unit. One scenario used the average $/SF plus one standard deviation and the other using the average $/SF plus one-half a standard deviation. Using than the currently proposed minimum sizes for each would have given developers an incentive to develop smaller than normal units, so larger than minimum units sizes were chosen.[8] Both were compared against the highest 221(d)(3) basis limits available for each county (the elevator building limits) and for selected counties, choosing the higher of two or more listed eligible basis limits. For the full standard deviation above the mean scenarios, both the R.S. Means and Marshall & Swift indexed $/SF costs showed a lowering of the eligible basis limits at the zero bedroom size, coupled with significantly higher limits at the two and four bedrooms sizes. For the one-half standard deviation above the mean scenarios, both the indexed $/SF costs showed a general lowering of the eligible basis limits at the zero bedroom size, more instances of a lowering of the basis limits at the one-bedroom size, and occasional negative impacts on limits at the three-bedroom size. There would seem little reason to believe that even with extensive "tweaking" this system can capture the cost-differentials between units of various types and sizes among the variety of project types financed by TCAC.
- Construction Costs Per Square Foot of Total Project Structures: This method of expressing the data has several advantages over the other methods considered. First, it reduces the data to the lowest common denominator. Second, it explicitly factors in projects that have additional costs associated with construction (i.e., large facilities, subterranean or podium parking, etc.) that may not occur in all projects. Third, this method of expressing construction costs is used by most contractors to roughly express construction, in fact, both the R.S. Means and Marshall & Swift publications express their cost indices in this manner. In analysis, staff found that using this method of expressing the data resulted in the most fair and even-handed outcomes among the various project types (with the possible exception of SRO and studio projects), and areas (both counties and regions).

[8] The unit sizes were chosen by simply up-sizing the units to the next unit size, and then applying TCAC's minimum size standards, with the exception of four-bedroom units, in which case 300 square feet were added to the four-bedroom unit size minimum.

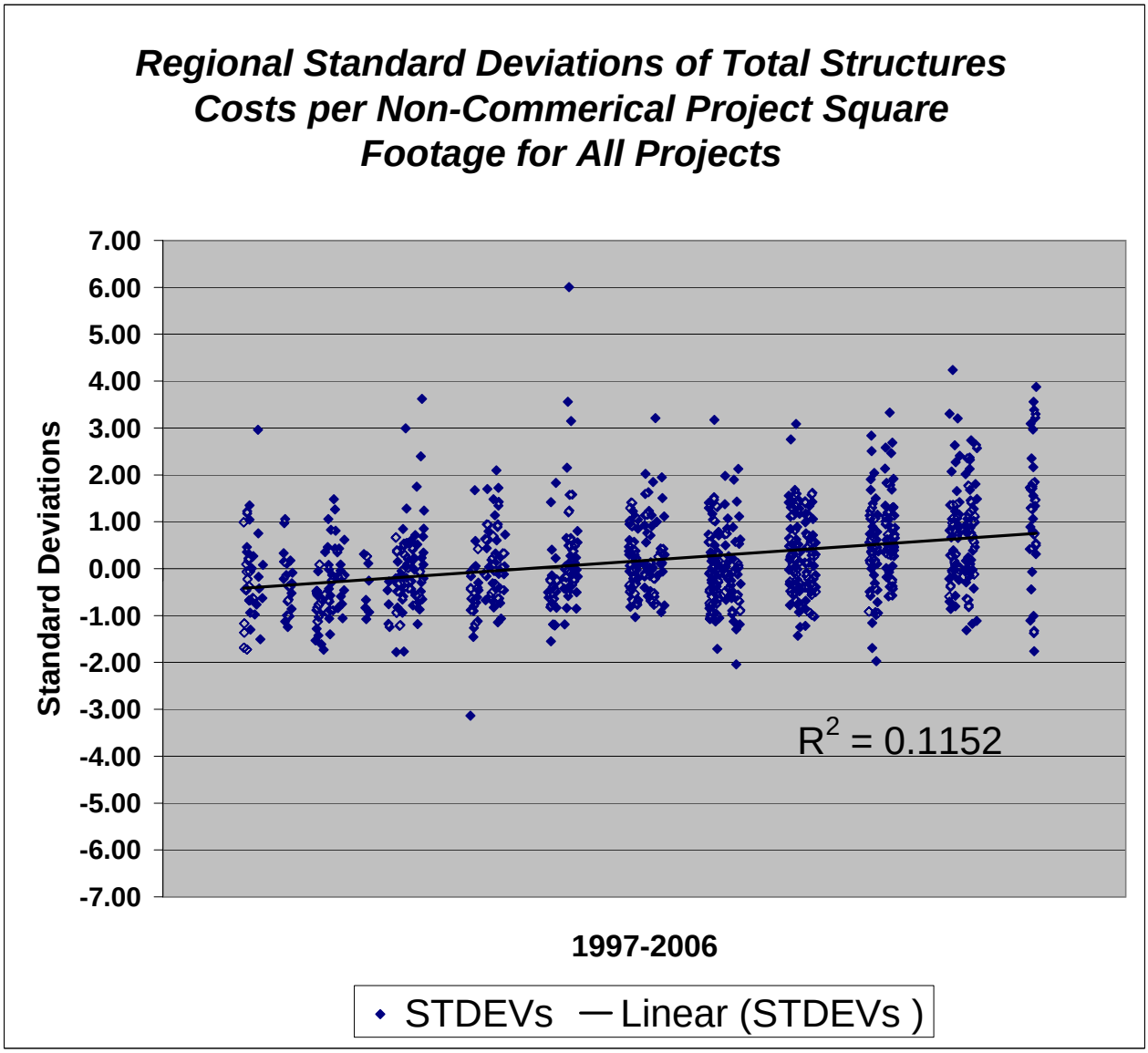
Staff has chosen the structures cost per square foot of total project structures as the most appropriate means of expressing the data for the purpose of calculating alternative eligible basis limits.

How the Data Set Will Change Over Time

TCAC will publish its threshold basis limits during the first three months of each year. The underlying data set will be continuously updated, prior to publication, by:

- Updating the indices for the various regions, based on the annual publication by R.S. Means. This data is typically available during the first quarter of each year.
- Adding new construction projects awarded credit in the previous year to the data set.
- Removing failed projects from the data set. The current data set reflects the active projects as of April 2007. The impact of any failed projects from May through December 2007, and each year thereafter, will not be seen until the annual updated basis limits are released.
- Updating project specific data as project owners submit requests for federal tax forms and placed-in-service packages.

Staff will also review the older inflation-adjusted structures costs per square foot values for projects generally. If it appears the cost indexing is failing to capture cost increases adequately, TCAC may choose to move to a rolling data set consisting of a select number of the most recent years. At present, the current system of indexing appears to be functioning well (see attached chart).


Regional Standard Deviations of Total Structures Costs per Non-Commerical Project Square Footage for All Projects
Standard Deviations
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
-1.00
-2.00
-3.00
-4.00
-5.00
-6.00
-7.00
R2 = 0.1152
1997-2006
STDEVs
Linear (STDEVs)